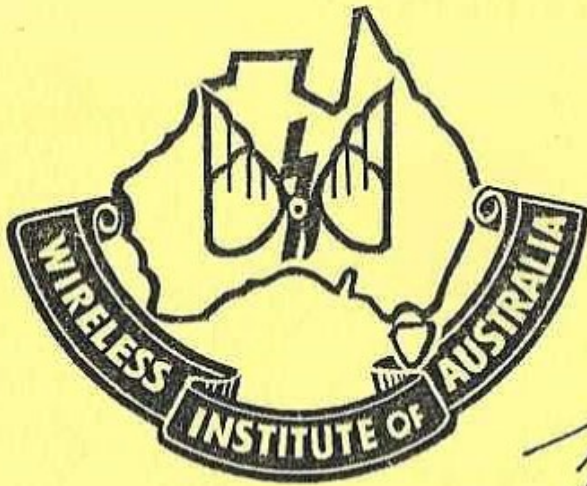
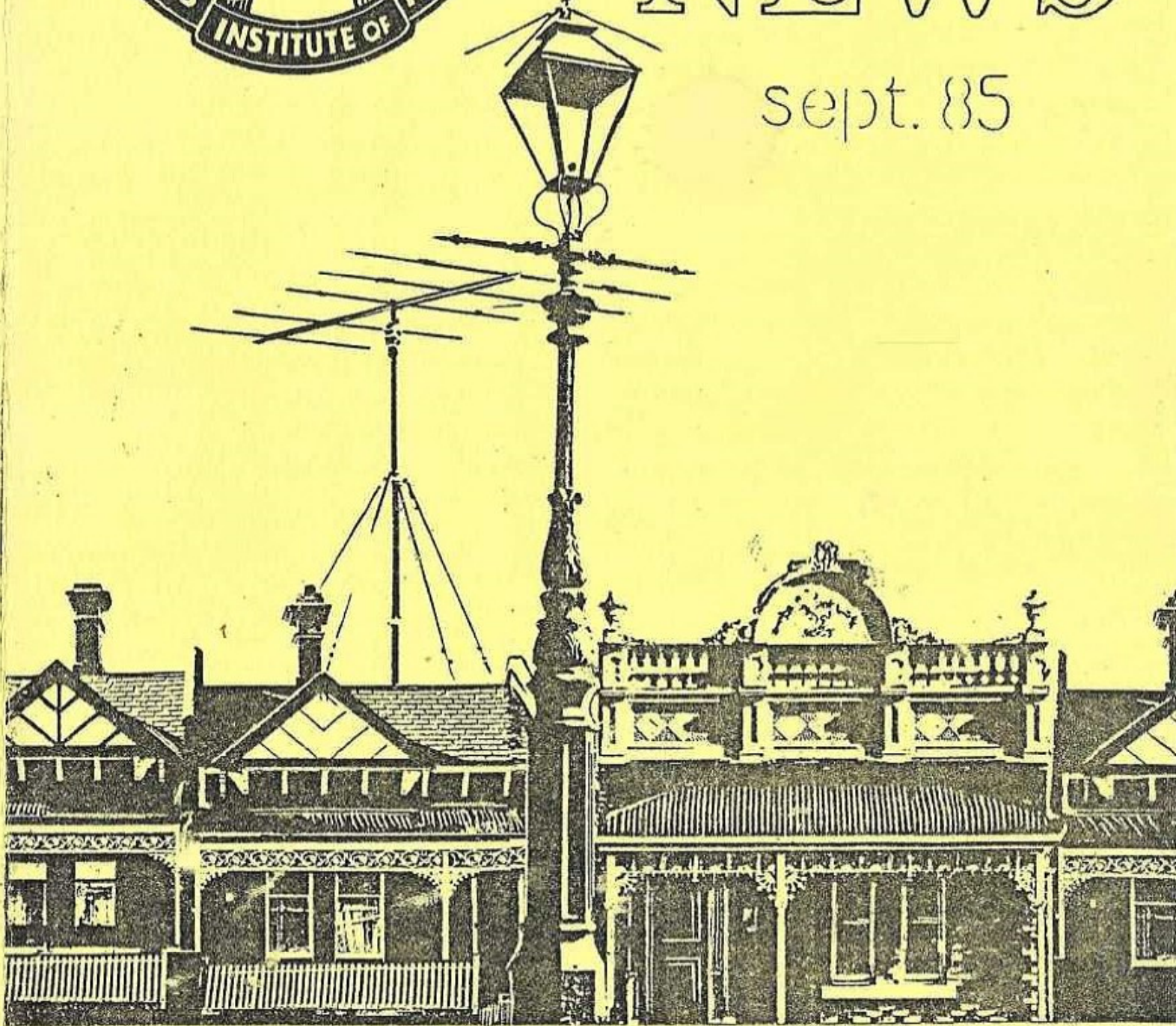


85/09 01



B·A·R·G NEWS

sept. 85



© **Monthly Newsletter of the
Ballarat Amateur Radio Group**

85/09 02

COMMITTEE

B.A.R.G. OFFICERS 1985-1986

			<u>HOME</u>	<u>BUSINESS</u>
President.	Lou Iaquinto.	VK3 DFI	49 2200	Ext.241 After 4.30
Vice President	Geoff Smith.	VK3 ADB	32 1037	
Secretary	Jim Wright.	VK3 CFB	32 7563	
Asst. Secretary	Dick Forrester.	VK3 VU	35 7663	39 1001
Treasurer	Harry Hekkema.	VK3 KGL	35 7563	39 1001
Technical Officers	Phil Seddon	VK3 AQM	31 5220	31 3166
	Ian Robinson.	VK3 BTX	32 4139	
	Maurie Batt.	VK3 XEX	42 2245	
	Dick Antosiewicz.	VK3 AEX	32 3273	31 1818
Q.S.L. Manager	Cliff Bilston.	VK3 PAF	35 8048	
Awards Manager	Maurie Batt.	VK3 XEX	42 2245	
Publicity Officer	John Hazledine.	VK3 CFH	39 1971	
Education Officer	Bob Terrill.	VK3 BNC	39 5317	39 1001
Property Officer	Dick Antosiewicz.	VK3 AEX	32 3273	31 1818
Newsletter Committee.	Dick Forrester.	VK3 VU	35 7663	39 1001
	Fred Quick.	VK3 NIH	32 3216	32 6455
	Ron Watkins.	VK3 XOA	35 6017	32 1447
	Henry Horitz.	VK3 DXC	35 5130	
Net Co-ordinator	Fred Quick.	VK3 NIH	32 3216	32 6455
W.I.C.E.N. Committee	Dick Antosiewicz.	VK3 AEX	32 3272	31 1818
	Geoff Smith.	VK3 ADB	32 1037	
	Dick Forrester.	VK3 VU	35 7663	39 1001
Committee	Neil Davidson.	VK3 KQQ	35 9612	
	Peter Kenyon.	L30037		
	Evonne Wroe.		42 4376	

B.A.R.G. Meets the LAST FRIDAY of every month at the
BALLARAT EDUCATION CENTRE, Hopetoun Street. at 7.30 p.m.
 All Correspondence to P.O. Box 216E Ballarat East. 3350 Vic.

Awards Manager, VK3-XEX, R.S.D. Rokewood Junction. Vic.

The meeting was called to order by President Lou at 7.50pm.

85/09
03

APOLOGIES Evonne Wroe, NIZ, SE, ZL.

MINUTES as published in Newsletter were confirmed.

CORRESPONDENCE J.Mildren M.P.re availability of Amateur Radio Operators Handbook. This will only be available from Government Printing Office or W.I.A.

Ballarat Communications requesting to share SEC power at repeater site on Mt. Buninyong.

TREASURER Harry is on holiday. Newsletter postage \$13.29 passed for payment. Secretary to attend to this.

Q.S.L.MANAGER Cliff reported 207 cards in and 54 out.

AWARDS MANAGER Maurie dispatched 1 Goldrush and 2 DX Widows awards he also presented the Club with \$50.00 from awards account

CLUB NET Co-ordinator Fred would like to hear more BARG stations on the Net, if only for a short period.

EDUCATION OFFICER Bob stated that the class is going well and the Students are enthusiastic.

NEWS LETTER Ron XOA is keen to receive material for publication, this can be left at his home QTH or the Firestation in Sturt St.

MOTIONS Moved DOK seconded YNW that Bill DWJ investigate price of Computer for Hamfest raffle prize. Carried.

Moved DOK seconded PAF that Club meet cost of repairs to secretary's typewriter. Carried.

Moved NII seconded AAI that Ballarat Communications request for power be declined. Carried.

Moved NWN seconded AXH that Cliff PAF be authorised to have 2000 QSL cards printed for Club Station BML.

GENERAL BUSINESS.

President Lou thanked those who participated in the R.D. Contest with a special mention of Neville PNP and Leon NLR for a great job. In excess of 700 contacts were made. He also thanked all those who assisted in the WICEN exercise at the Orienteering championships at Creswick.

Greg DIE reported on a visit to Ansett workshops being available and it was decided that the Club would avail itself of this offer on Friday 18th October and take a bus down. Secretary to write and confirm.

Ian AXH reported that fees for DOC examinations have been increased to-
NAOCP & AOCF Theory \$10.00 each.
Regulations \$10.00. Morse \$5.00 each examination.
Certificate of Proficiency \$5.00

On that happy note the meeting closed at 8.30pm and after a short break George DOK proceeded with the Junk Sale raising the magnificent sum of \$48.57 in commission for the Club. Thanks George.

Finally a minute of thanks and appreciation from me to all those members who so kindly phoned enquiring after my health and for your financial assistance with the typewriter repairs, also I regret to inform you that Ted NIZ is not too good and I'm sure he would appreciate a call or visit.

73s from Jim CFB.

NEXT COMMITTEE MEETING 23rd October.

85/09 04

Ballarat Amateur Radio Group

VK3BML

P.O. BOX 216E
BALLARAT EAST, VICTORIA, 3350

The Ballarat Amateur Radio Group will be conducting the 1985 "HAMVENTION" during the weekend of November 2nd and 3rd 1985.

The venue will be the Sebastopol Football Club rooms located at the Marty Busch recreation reserve 7Km south of the Ballarat Town Hall on the Ballarat-Colac road. There will be a dinner on the Saturday night beginning at 7 p.m. at a cost of \$11.00 per head. Free refreshments will be served from 6-7 p.m. There will be a full bar service available during the evening.

The Sunday venue will also be at the recreation reserve. A full range of Amateur Radio events will begin at 9.30 a.m. with other ladies and children's events conducted during the day. A BBQ lunch and an afternoon tea will be provided at a cost of \$7.00 per head. (Children U12 free). A mystery bus tour has been arranged for non competitors during the afternoon.

Talk-in facilities will be provided on repeater VK3RBA (146.750 Mhz) and also on 3.610 Mhz SSB.

If you wish to attend the dinner on Saturday night then it is important that you book with the Hamvention Convenor, KEVIN HUGHES VK3WN, P.O. Box 216E, BALLARAT EAST 3350 no later than October 27th, 1985. There is a form provided below for your convenience. The club regrets that we are unable to arrange accommodation this year but can recommend several local motels/caravan parks. Please telephone KEVIN HUGHES VK3WN on 053-355011 if you need assistance.

MAKE YOUR DINNER BOOKING TODAY

NAME _____ CALLSIGN _____

ADDRESS _____ TELEPHONE _____

No. ATTENDING DINNER ADULTS _____ CHILDREN _____

PLEASE RETURN TO KEVIN HUGHES, P.O. BOX 216E, BALLARAT EAST 3350, NO LATER THAN OCTOBER 27TH, 1985.

A PROFILE OF A SECRETARY

If a secretary writes a letter, it's too long;

If he sends a postcard, it's too short;

If he issues a bulletin, he's a spendthrift;

If he offers a suggestion, he's a know-all;

If he says nothing he's useless;

If the attendance at a meeting is slack, he should have telephoned the members;

If he asks a member for his subscription, he's insulting;

If he doesn't, he's lazy.

If a function is a big success, the committee gets the praise;

If it's a failure, the secretary gets the blame;

If he asks for advice, he's incompetent;

If he doesn't he's running the show.

Ashes to ashes, dust to dust,

If others won't do it, the secretary must.

ANON.

Keep batteries from children

Wafer-thin batteries used in calculators, watches and cameras spell danger for young children.

Because those batteries are bright and shiny, they are easily discovered by children and can be fatal if swallowed. Even "dead" batteries can be harmful because of their chemical composition.

In a recent incident, a young boy's parents were unaware of the danger when their child swallowed one of these batteries. Several days later they sought medical help.

Unfortunately, it was too late. The alkaline chemicals had destroyed their

son's esophagus.

Four other children in Dallas received emergency surgery after swallowing the same type of batteries. Two other toddlers died because their parents were unaware of battery ingestion.

To protect your children from this potential killer, treat these batteries as you would any other poison — out of the reach of children.

Thanks to Joe Profitt of the Wright/Patterson Base Safety Office, and to R.F. Carrier.

— Lake Erie ARA, Cleveland, OH □

REPRINTED FROM — WORLD RADIO
JUNE 1985

E.M.C. NOTES

REPRINTED FROM D.O.C. NOTE

ELECTRO-MAGNETIC COMPATIBILITY OF AUDIO EQUIPMENT AND RADIO TRANSMITTERS

It is becoming more and more common for audio equipment and radio transmitters to be sited in close proximity to one another. The design of most audio equipment is such that radio frequency break-through from radio transmitters is likely to occur. The basic design of most amplifiers is such that they respond to signals well outside the frequency range that they are intended to handle. An audio amplifier has nominally to handle frequencies up to 15 kilohertz or so, but, most circuits will amplify or detect signals up to many megahertz and even as high as several hundreds of megahertz, if the level of the undesirable signal exceeds the nominal maximum that the amplifier can handle without distortion. The stage or stages that are being overdriven will detect the signal, much like an old time crystal set, and the succeeding stages will amplify the undesired signal to a level likely to approach the full output of the amplifier.

To overcome the break-through problem it is necessary to tailor the frequency response of all stages, in particular the low level and the output stages, where long leads are connected to semi-conductor junctions. The fitting of low pass filters at strategic points in amplifiers will attenuate their response to undesired radio frequency signals by at least 30 decibels.

Most sensitive amplifiers use one spot earthing to prevent earth loops causing hum pick-up and feedback between output and input. As a result of this, input leads and speaker leads are not earthed where they enter the amplifier case. Radio frequency currents will flow on these earthy leads to the point where they are physically earthed. The leads will exhibit inductive reactance at most radio frequencies so causing significant voltages to appear on semi-conductor junctions. If of sufficiently high level the RF energy will be rectified and the modulation content of an amplitude modulated signal will be reproduced in the output of the amplifier. An FM signal will also be detected but the rectified output will not have an audio component, but a shift in the DC operating conditions of the amplifier will occur resulting in distortion and level variation of intended audio output.

To overcome the problem of RF currents circulating throughout the earth (chassis) leads, which may be the earthy speaker lead returns or the shield braid of the input leads, it is necessary to ground these leads WHERE THEY ENTER THE CHASSIS at radio frequencies, but not at audio frequencies.

GUIDE LINES - SUPPRESSING AUDIO EQUIPMENT AGAINST RADIO FREQUENCY BREAK-THROUGH

Low pass filters to reduce the susceptibility of audio stages to RF signals can consist of one or two resistor/capacitor networks designed to have a cut-off frequency of 50 to 100 kilohertz. The exact frequency of the cut-off point is not of great importance as the frequencies of all except a few radio transmitters are well above 100 kilohertz. Television transmitters are in either the VHF or UHF regions. A typical low-pass filter is shown in figure 1. The values of the capacitors and resistors can be altered up and down in value to suit the impedance of the particular stage. In each case the capacitive reactance of the capacitor should be between 2 and 2.5 times the value of the resistance at the selected

cutoff frequency. This will approximate the 3db point. The aim is to keep the value of the capacitor down to a few hundreds of picofarads so that the inherent inductance of even the best capacitor does not become evident until a very high frequency has been reached. It is necessary to keep the capacitor leads short so that this inductance is kept to a minimum.

The shield earths and other earthy leads such as the earthed speaker lead need an RF bypass capacitor at the point of entry of the cable into the unit. The capacitor bypasses most of the RF to earth whereas previously the conducted RF only reached earth by inductive and capacitive paths which may include many semi-conductor junctions. Typical values to use range from 0.001uF to 0.1uF. Low voltage ceramic capacitors are small and have little inductive effect, and should be fitted with the shortest practical lead length to keep this inductive effect to a minimum, so keeping the self resonant frequency of the filter high. See figures 2 and 3.

The active lead of the speaker line will need filtering in a similar manner to the earthy lead, and the same values are applicable. In more difficult cases the fitting of an RF choke in series with the active speaker line may be necessary. Due to the low impedance of the speaker systems it is necessary for this choke to have very low DC resistance. A suitable RF choke would consist of 20 to 30 turns of insulated single conductor wire of about 0.7mm (0.028") diameter wound on a ferrite rod 9.5mm (3/8") diameter by 50mm (2") long. In amplifiers which are particularly susceptible to RF signals or where the signals are extremely strong, an additional capacitor on each active speaker may be necessary. The three stages are shown in figure 2. Stage 1 is the fitting of C1 C2 and C3, stage 2 is the addition of RFC1 and RFC2 and stage 3 is the addition of C4 and C5. Ferrite beads can be slid over the speaker and earth return lines, and small wound ferrite chokes can be wired in these lines as well. The beads and small ferrite chokes are more suited to RF suppression in the VHF region.

Some audio amplifiers will go into uncontrollable audio or supersonic oscillation if any sizeable capacity is wired from the speaker lines to earth. In these cases it will be necessary to use only the RF chokes and perhaps some very low values of capacity to bypass VHF energy. The choke winding for both speaker lines can be accommodated on one 1 1/2" to 2" diameter ferrite toroid. All the speaker lines can be wound on the one toroid and no saturation of the ferrite core will occur as the currents in the speaker lines cancel one another. However, the toroid is in series with any RF and will prevent most of the RF currents induced on the speaker lines from entering the amplifier.

The principles discussed have applied to methods of protecting audio equipment from both HF and VHF transmissions. Additional suppression may prove necessary in some cases of VHF break-through. It is desirable that all low level audio stages have a ferrite bead placed over the base lead of each susceptible transistor. Small wound ferrite chokes are also available which would be suitable for speaker lines and power leads. The amplifier should be housed in an all metal cabinet, and if not the inside of the case can be lined with metal foil which is bonded to the chassis of the amplifier. In some amplifiers the low level signal leads are not shielded which makes the amplifier extremely vulnerable to RF break-through. These leads should be shielded and treated as shown in figure 3.

Where it is shown that the RF energy is being introduced to the amplifier via the power line, filter capacitors can be fitted to the mains as shown in figure 4. It is important that the capacitors do not exceed the value shown and

must be rated for continuous operation across the normal mains power leads. The size of these capacitors and their voltage ratings are determined by the electric power authorities.

In isolated cases amplifier wiring including speaker, inputs and power leads may be resonant at transmission frequencies of nearby transmitter installations. Resonant sections will magnify radio frequency voltages (or currents) at critical points within an amplifier and the best solution is to re-arrange wiring or leads so that resonance no longer occurs at the transmission frequency(ies) affecting the installation. Where lead alteration is impractical then tuned trap circuitry will in most cases be necessary. However, the problem of resonance of amplifier wiring and leads should only occur in rare instances.

SUMMARY

Many audio amplifiers due to their design are susceptible to radio frequency break-through. With the addition of a few small inexpensive components at the manufacturing stage, and with proper attention to shielding and general layout the incidence of radio frequency break-through would be reduced considerably. The use of the techniques described in this paper will reduce significantly the likelihood of audio amplifiers responding to the radio frequency emissions from transmitting equipment. The expected improvement in immunity to the effects of strong RF fields should exceed 30 decibels. The information contained in this paper will be of assistance to manufacturers in designing equipment for improved compatibility when operating in radio frequency fields, and for service personnel who are involved in suppression work on existing equipment. A typical two section low-pass filter with a nominal cut-off of 50 kHz, designed to be used on amplifier inputs is shown in figure 5.

ADDENDUM

It has been found that amplifiers which have been treated for radio frequency breakthrough are relatively immune to switching transients as caused by the operation of refrigerators, light switches, air-conditioners, etc. These transients manifest themselves as clicks and plops in the loudspeakers.

EARTHING OF ANCILLARY EQUIPMENT

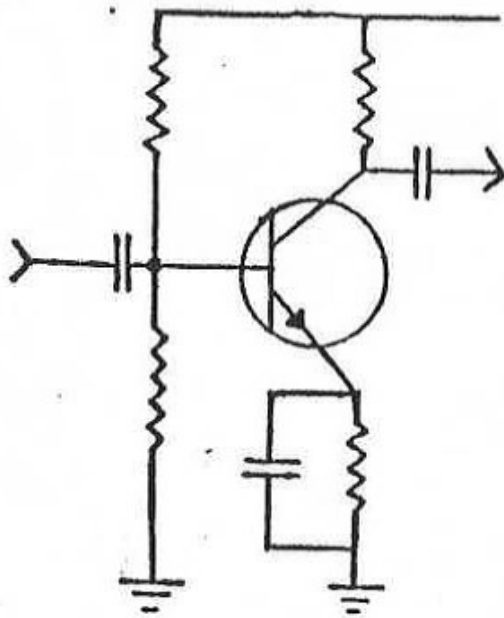
An amplifier may in itself be relatively immune to interference, but due to the incorrect attachment of ancillary equipment such as a turntable, cassette recorder or tuner, the possibility of interference is likely to be considerably increased. Often the chassis/frame of the ancillary equipment is not earthed to the chassis of the amplifier. This may cause high RF voltages to be developed between the amplifier and the attached equipment. In most cases the level of the RF voltages will be reduced considerably by bonding/earthing the various pieces of equipment together. In some instances this may cause hum-loops to be formed. In these cases bonding as such is not possible. However, the bonding can be used by inserting a capacitor of 0.001 μ F to 0.1 μ F in series with the bonding wire or strap.

SPEAKER LEADS

Under some circumstances it may be found that by using shielded cable for the speaker leads the breakthrough of RF energy into amplifiers is eliminated.

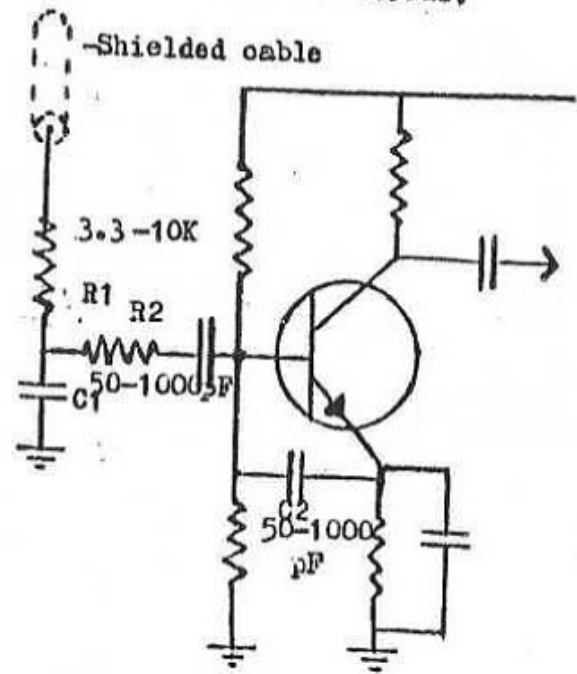
Original Circuit

Fig 1.



Amplifier input circuit 1st stage

Modified Circuit

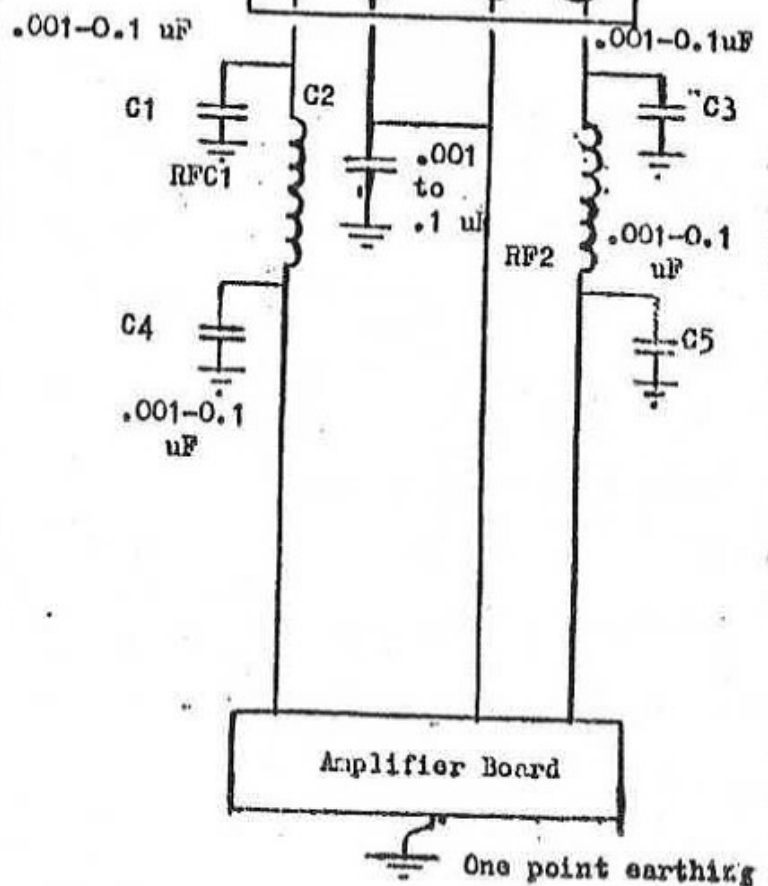
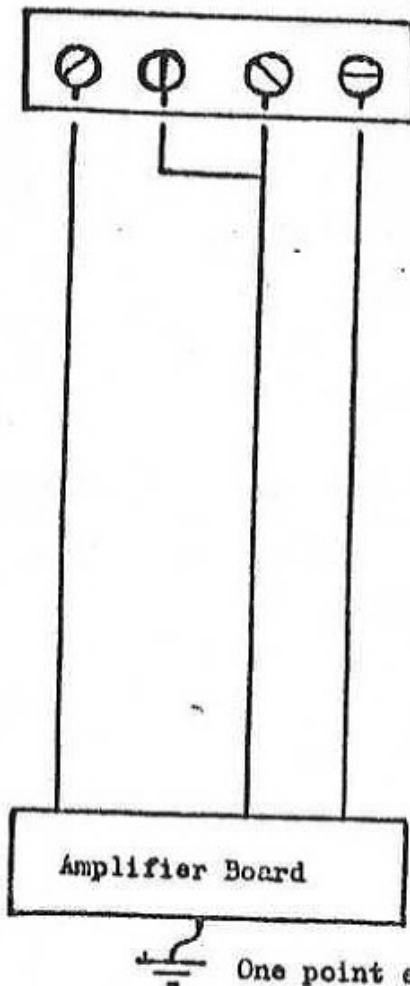


Amplifier input circuit 1st Stage

Fig 2.

Speaker terminals on amplifier

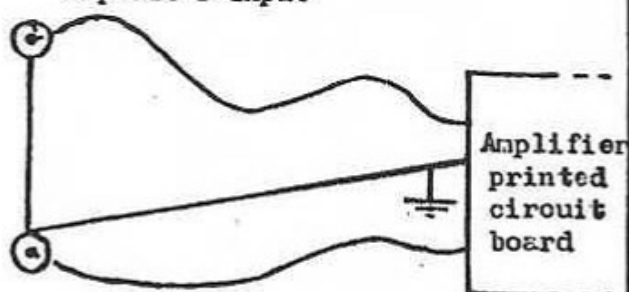
Speaker terminals on amplifier



Original Circuit

Fig 3.

Amplifier input



unshielded input leads from socket to amplifier board.

Modified Circuit

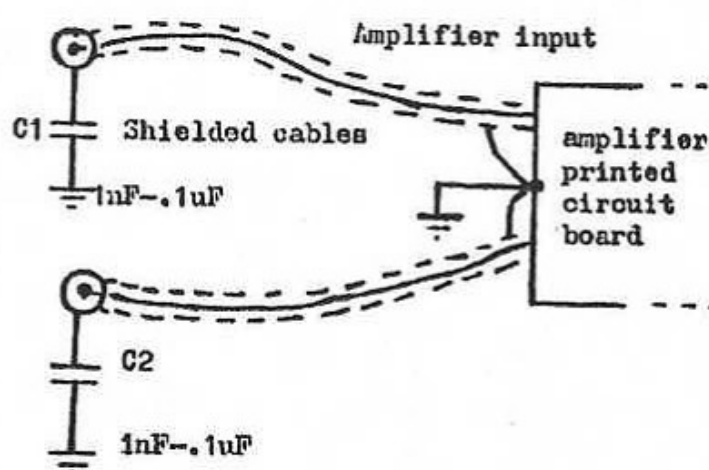
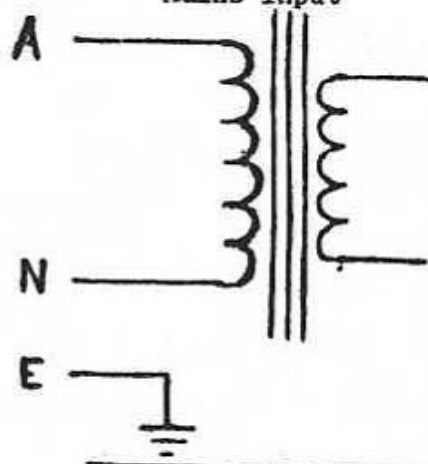


Fig 4.

Mains input



Mains input

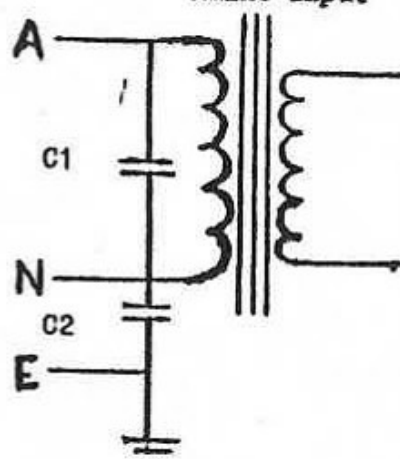
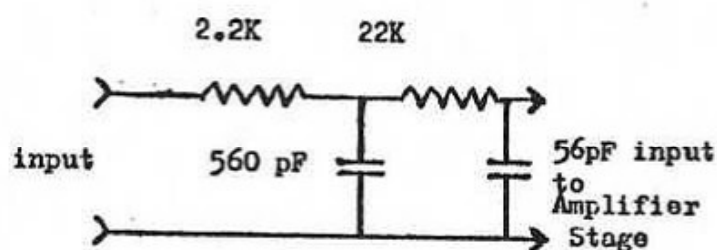


Fig 5



Capacitors C1 C2 are of values & voltage approved by Electrical Supply Authorities for connection to mains.

C1 = $.01\mu\text{F}$ to $.1\mu\text{F}$

C2 = $.002\mu\text{F}$ to $.005\mu\text{F}$

85/09 11
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EVERYTHING FROM A TO Z IN ELECTRONICS

B.A.R.G. Ladies Committee.

Meeting held 13th Sept., '85.

Convention 2nd-3rd November, '85.

Ladies will once again be catering for Sunday Lunch and Afternoon Tea. New members welcome, even if it's just to help on the day of the Convention.

Interested parties next meeting,

Gwen Davidson's
10 Rowlands St.,
Sebastopol.

10th October, '85.
8p.m.

New Office Bearers Elected.

President - Yvonne Wroe.
Vice President - Karen Felstead.
Treasurer - Betty Terrill.
Secretary - June Forrester.

Congratulations to previous office bearers on a job well done.

COMING EVENTS:- Convention 2nd-3rd November. Ladies help needed!
Christmas Dinner 12th December, 7p.m.,
Western Hotel, A la carte menu.
Christmas Tree, 15th December, \$2.00 per family.
B.B.Q., Lollies, Icecream & Soft drinks provided.
SANTA will be there bearing gifts.
ADULTS, B.Y.O., Refreshments.

J.F. Secretary.

The members of the B.A.R.G. Ladies Committee, extend their deepest sympathy to Judy Smith and family, on the sad loss of Judy's father.

12 85/09 12

BALLARAT

HAMVENTION

1985

Come and be part of the
fun

Trade displays

Competitions and

Many other activities

Sat 2ND Sun 3RD November